

CLAIMS

1. A method of processing a single channel audio signal to provide an audio signal having left and right channels corresponding to a sound source at a given direction in space relative to a preferred position of a listener in use, the information in the channels including cues for perception of the direction of said single channel audio signal from said preferred position, the method including the steps of: a) providing a two channel signal having the same single channel signal in the two channels; b) modifying the two channel signal by modifying each of the channels using one of a plurality of head response transfer functions to provide a right signal in one channel for the right ear of a listener and a left signal in the other channel for the left ear of the listener; and c) introducing a time delay between the channels corresponding to the inter-aural time difference for a signal coming from said given direction, the inter-aural time difference providing cues to perception of the direction of the sound source at a given time, characterised in that the method includes controlling the magnitude of the left signal and the right signal to be at respective values at said given time, the values being chosen to provide cues for perception of the distance of said sound source from said preferred position at said given time.
2. A method of processing a single channel audio signal as claimed in claim 1 in which the left signal magnitude and the right signal magnitude are chosen separately.
3. A method as claimed in any preceding claim in which the left ear signal magnitude and right ear signal magnitude are determined by choosing a position for the sound source relative to said preferred position of the head of a listener in use, determining the distance from the chosen position of the sound source to respective ears of said listener, and determining the corresponding left signal magnitude and right signal magnitude using the inverse square law dependence of sound intensity with distance.

4. A method as claimed in claim 3 in which the distance from the chosen position of the sound source, at said given time, to respective ears of said listener is determined from a look-up table.
5. A method as claimed in claim 3 in which the distance from the position of the sound source, at said given time, to the centre of the head of said listener is chosen, and the distance to respective ears is determined from the inter-aural time delay.
6. A method as claimed in claim 5 in which the distance to respective ears is determined from a look-up table.
- 10 7. A method as claimed in any preceding claim in which the magnitude of the left signal or the magnitude of the right signal is sufficiently small as to be inaudible.
8. A method as claimed in any preceding claim in which the left signal and right signal are compensated to cancel or reduce transaural crosstalk when supplied as left and right channels for replay by loudspeakers.
- 15 9. A method as claimed in any preceding claim in which the resulting two channel audio signal is combined with a further two or more channel audio signal.
10. A method as claimed in claim 9 in which the signals are combined by adding the content of corresponding channels to provide a combined signal having two channels.
- 20 11. A computer program for implementing a method as claimed in any preceding claim.
12. Apparatus for performing the method as claimed in any preceding claim.
- 25 13. An audio signal processed by a method as claimed in any of claims 1 - 10.

add AT